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Cruise Ships and Ferries' Medical Facilities' Requirements: An Operative Guideline Used in Authorization †

Antonello Campagna * and Rosa Maria Russo

Italian Ministry of Health, Liguria Health Port Authority; 16126 Genova, Italy

* Correspondence: camp.anto@virgilio.it

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Abstract: Adequate medical facilities on passenger ships are essential to ensuring the quality of medical care and public health actions. Their design and construction is complex, as they have to comply with several regulations and recommendations from different authorities (IMO, ILO, EU, WHO), national flag legislation and advices from scientific societies. Therefore, proper authorization procedures become very important. The working guideline, developed in the light of our experience gained in new Italian cruise ships/ferries' medical facilities' authorization processes is presented. Innovative points are the participative continuous approach "from the board to the sea" and the Dynamic-Planning Method based on "what if" scenario model. A careful balance of the required features and standards against costs without compromising the quality of care is possible. The guidelines are open to be continually reviewed, updated, and expanded with the contribution of stakeholder's. Readers are encouraged to provide feedback and to contribute material for further updates.

Keywords: ship medical facilities; guideline; ship's hospital; cruise ship

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1. Introduction

A ship's medical facilities play a very important role on board, not only when injuries occur, but also for infectious disease control.

They must be able to provide quality care (stabilization, therapeutic maneuvers for critically ill or unstable patients, adequate care for diseases, and support for medical evacuation when appropriate), diagnoses, investigations, and surveillance, and must possess adequate isolation capabilities in case of infectious disease outbreaks.

The design and construction of adequate medical facilities is complex, as they have to comply with several regulations and recommendations from a number of different authorities (e.g., the IMO, ILO, EU, WHO, SHIPSAN Manual, national flag legislation, and advice from scientific societies). However, experience shows that these regulations are not always followed, and that even compliance with existing regulations does not always produce an optimal result.

The aim of this article is to provide, after an overview of the main international reference documents, a useful working guideline on the requirements of a ship's medical facilities from a practical viewpoint that takes into account both clinical and public health issues. The contents have been developed in the light of our experience gained in new Italian cruise ships/ferries' medical facilities' authorization processes.

In this document, we also recommend solutions that are not formally required by regulations but constitute recommended ways of complying with the specifications of the health-related best practices from onshore hospitals (e.g., the clinical risk management system). These guidelines are open to be continually reviewed, updated, and expanded with the contribution of all stakeholders. Reader re encouraged to provide feedback and to contribute material for further updates.

2. Material and Method

The Guidelines include the following items (Table 1):

Table 1. Contents of Guidelines.

Chapter	Item
Administrative provisions	Steps of Approval Process
Design	Required Rooms (doctor's office, examination, waiting area treatment and stabilization rooms, ICU, isolation ward), Area (sufficient working space), number of beds in relation to people onboard and type of navigation, layout and functional relationships.
Access, mobility, security	Location, lifts, accessibility from wheelchairs and stretchers, transfer of sick/injured persons in the ship, distance between the most likely places for injuries and the hospital, ability to evacuate patients by helicopter/rescue boat, toilet for the disabled, signage and information.
Occupational health and safety	Radiation and biohazard protection, post-exposure prophylaxis (PEP) for blood
Non-medical equipment	Furnishing, hospital beds, food service trucks, electrical power distribution, emergency power generation, lighting system, computer equipment and communication system.
Medical equipment and medicine chest	Medicines: (compliance with regulations, storage cupboard including locked box, refrigerator, labelling, registration of usage). Equipment (resuscitation, examination and monitoring, dressing and suturing, immobilization of fractures, Oxygen, kit for sexual assault, pest control and sanitation, case carts, laboratory testing and X-ray-imaging capabilities, morgue, telemedicine, system for maintenance and control in accordance with biomedical quality control recommendations).
Infection prevention control	Isolation rooms, ventilation system, HEPA filters, hand-washing facilities, facets of construction (surface and finishes), separation of dirty and clean area, waste management, provisions for ease of cleaning a selection of materials, provision for sterilization and disinfection of equipment and instruments; planned workflow to prevent cross contamination, staff vaccination program, PPE, procedures for infectious diseases outbreaks.
Staff	Number and qualifications; experience post-graduate/post-registration; specialization; certification—ACLS, PCLS, or ATLS; skills in minor surgical and orthopedic procedures; training in X ray techniques; language skills; training/drills (rapid medical response team; lifesaving procedures; transfer of patient from site of accident to ship medical facility and further to the deck for evacuation; procedures for seeking radioed medical advice; use of medication/medical equipment; man-overboard recovery including hypothermia treatment).
Services and environmental	Control of temperature range, humidity, air changes per hour, water system.
Emergency preparedness	Reserved emergency hospital; evacuation area; first-aid station; first-aid kits in life raft, galley, and engine room; dedicated emergency telephone number advertised for both passengers and crew; contingency medical plan (procedures/equipment/designated crew assigned to assist the clinical staff) for emergency scenarios (fire, falls, crush accident, and massive disease outbreaks) with evidence of periodic training/drills)

Table 1. *Cont.*

Chapter	Item
Procedures	Clinical and emergency; infectious disease treatment; sexual assault response program; clinical risk management; audit program; facilities maintenance program; patient confidentiality; system to enable the pax/crew to provide pertinent information regarding special medical needs prior to embarkation; procedure for receiving, evaluating, and responding to patient feedback/complaints; Medical documentation

3. Results

We have provided an operative checklist for reviewing the design, furnishing, and operation of passenger ships' medical facilities. Real case histories from our experience gained in the authorization process of cruise ships and ferries, in a construction-phase shipyard, have been presented.

4. Discussion and Conclusions

Adequate medical facilities on passenger ships are essential to ensuring the quality of emergency treatments, medical care, and public health actions. Therefore, they need to be efficiently planned and competently designed and equipped; in this perspective, proper authorization procedures become very important.

Since a one-step authorization procedure limited to the end of the building phase, without consultation with stakeholders, is completely ineffective, we have adopted a participative process involving the ship's owner, the shipping company's medical department, the ship's designers, the shipyard construction supervisor, the ship's doctor association, and the classification company.

A continuous approach "from the board to the sea" with intervention in the different building phases (planning as well as inspection in the shipyard and upon entry into service) is of fundamental importance alongside careful monitoring after launch, especially in the first year of service.

According to this participative/continuous approach, the Maritime Health Authority will endeavor to identify any design- and construction-related non-compliance to be eliminated before launch.

We have also observed that although the quality of design and construction has a major impact on the quality of health care, it is not the only influence. Management practices, staff quality, and the regulatory framework have a potentially greater impact. Consequently, functional and organizational requirements are important as well as structural ones.

While in the past the main focus was on structural criteria (the number of beds and isolation capability), nowadays, it is important to design the new medical facilities according to a "A Health Ship Service Planner" that also considers benchmarks and the type of navigation and information used to determine the raw demand (Occasions of Service, Average Length of Stay, and Presentations Per Annum).

According to this Dynamic-Planning Method, a "what if" scenario approach is always necessary. This is an effective way to detect potential problems and can be lifesaving as well as cost saving. Some scenarios have been described in the document (contagious disease outbreaks, fire, falls, crush accidents, the transfer of sick or injured people, and evacuation, training), though the list is not intended to be exhaustive.

In our experience, improve the quality of ship's medical facilities' requirements does not necessarily increase costs; on the contrary, it can have economic benefits resulting from an optimal management of clinical and health-related public issues on board. A careful balance of the required features and standards against costs without compromising the quality of care is possible.

These guidelines are open to be continually reviewed, updated, and expanded with the contribution of scientific societies, ships' designers and builders, ship owners, maritime

organizations, authorities, inspectors, and the ship's crew and medical staff. Readers are encouraged to provide feedback and to contribute material for further updates.

In the future, it would be important for maritime health authorities to share the precious experience gained from ships' medical facilities' authorization procedures rather than waste it in order to achieve common, globally accepted guidance.

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